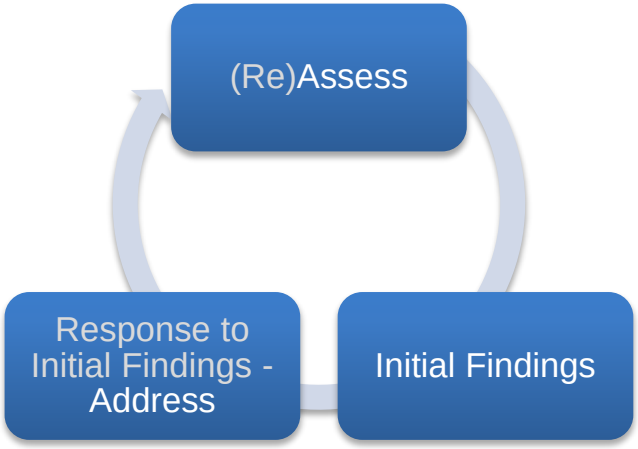
Subject Area Committee Name: MT

Contact Person:

Name	*e-mail*
Eric Kirchner	ekirchne@pcc.edu

Use this form if your assessment project is a follow-up reassessment of a previously completed initial assessment. The basic model we use for core outcome assessment at PCC is an "assess – address – reassess" model.



The primary purpose for yearly assessment is to improve student learning. We do this by seeking out areas of concern, making changes, reassessing to see if the changes helped.

Only one focal assessment or reassessment report is required this year. Document your plan for this year's reassessment report in the first sections of this form. This plan can be consistent with the Multi-Year Plan you have submitted to the LAC, though, this year, because PCC is engaging in a year-long exploration of our core outcomes and general education program, SACs are encouraged to

explore/assess other potential outcomes. If reassessing, complete each section of this form. In some cases, all of the information needed to complete the section may not be available at the time the report is being written. In those cases, include the missing information when submitting the completed report at the end of the year.

- Refer to the help document for guidance in filling-out this report. If this document does not address your question/concern, contact Chris Brooks to arrange for coaching assistance.
- Please attach all rubrics/assignments/etc. to your report submissions.
- **Subject Line of Email:** Ressessment Report Form (or RRF) for <your SAC name> (Example: RRF for NRS)
- **File name:** SACInitials_RRF_2016 (Example: NRS_RRF_2016)
- SACs are encouraged to share this report with their LAC coach for feedback before submitting.
- Make all submissions to learningassessment@pcc.edu.

Due Dates:

- **Planning Sections of LAC Assessment or Reassessment Reports: November 16th, 2015**
- **Completed LAC Assessment or Reassessment Reports: June 17th, 2016**

Please Verify This Before Beginning this Report:

☒ *This project is in the second stage of the assess/re-assess process (if this is an initial assessment, use the LAC Assessment Report Form LDC. Available at: http://www.pcc.edu/resources/academic/learning-assessment/CTEAssessment_Templates.html*

Initial Assessment Project Summary (previously completed assessment project)

Briefly summarize the main findings of your initial assessment. Include either 1) the frequencies (counts) of students who attained your benchmarks and those who did not, or 2) the percentage of students who attained your benchmark(s) and the size of the sample you measured:

All students in the program are assessed. 15/19 achieve the outcome to a high level. Those that do not achieve the outcome would mainly benefit from more resources external to the program, such as: financial aid, councelling, tutoring, time, college preparation.

Briefly summarize the changes to instruction, assignments, texts, lectures, etc. that you have made to address your initial findings: Changes to instruction were not warranted based on the results of the previous assessment
If you initially assessed students in courses, which courses did you assess: MT200 Semiconductor Processing
If you made changes to your assessment tools or processes for this reassessment, briefly describe those changes here: Separated the assessment of process from the assessment of communication. The new assessment uses a pre and post written exam in the course.

1. Outcome Chosen for Focal Analysis

1A. Briefly describe what and why this focal outcome is being investigate: (e.g., "First term students do not seem to be able to transfer the knowledge from their math class to our program class. We wish to investigate student understanding of the needed math concepts upon entry into our course. If students do have the theoretical understanding, we will investigate ways we can help students apply their knowledge in a concrete application." A second example is: "Anecdotally, it seems that our first year students are not retaining critical information between Winter and Spring Quarters." We will measure student benchmark attainment in Winter Quarter. Monitor and maintain manufacturing processes: the prior assessment tool convolutes effects of two outcomes. A revised tool needs to be developed.
1B. If the assessment project relates to any of the following, check all that apply: ☒ *Degree/Certificate Outcome – if yes, include here: Monitor and maintain manufacturing processes* ☐ *PCC Core Outcome – if yes, which one:* ☒ *Course Outcome – if yes, which one: Monitor and maintain device production by recognizing how they look and function in silicon planar technology, including: resistors, capacitors, diodes, PV cells, and MOSFET transistors*

Monitor and maintain device production by following the manufacturing flows to create these devices
Develop increasing competence in an assigned production area by researching various aspects, such as: effects on device structure, relationship to process flow, resulting film properties, process mechanisms, effects of process inputs and settings, interactions between processes, equipment used, equipment options, process monitoring.
Enhance production and maintenance teams by presenting these topics to teammates so that they can understand, and similarly learning other processes and topics from teammates.

2. Project Description

2A. Assessment Context

Check all the applicable items:

☒ **Course based assessment.**

Course names and number(s): MT200
Expected number of sections offered in the term when the assessment project will be conducted: 2
Number of these sections taught by full-time instructors: 2
Number of these sections taught by part-time instructors: 0
Number of distance learning/hybrid sections included: 0
Type of assessment (e.g., essay, exam, speech, project, etc.): exam

Are there course outcomes that align with this aspect of the core outcome being investigated? ☒ Yes ☐ No

If yes, include the course outcome(s) from the relevant CCOG(s): Monitor and maintain device production by recognizing how they look and function in silicon planar technology, including: resistors, capacitors, diodes, PV cells, and MOSFET transistors
Monitor and maintain device production by following the manufacturing flows to create these devices
Develop increasing competence in an assigned production area by researching various aspects, such as: effects on device structure, relationship to process flow, resulting film properties, process mechanisms, effects of process inputs and settings, interactions between processes, equipment used, equipment options, process monitoring.
Enhance production and maintenance teams by presenting these topics to teammates so that they can understand, and similarly learning other processes and topics from teammates.

☐ **Common/embedded assignment in all relevant course sections.** An embedded assignment is one that is already included as an element in the course as usually taught. Please attach the activity in an appendix. If the activity cannot be shared, indicate the type of assignment (e.g., essay, exam, speech, project, etc.):

☐ **Common – but not embedded - assignment used in all relevant course sections.** Please attach the activity in an appendix. If the activity cannot be shared, indicate the type of assignment (e.g., essay, exam, speech, project, etc.):

☐ **Practicum/Clinical work.** Please attach the activity/checklist/etc. in an appendix. If this cannot be shared, indicate the type of assessment (e.g., supervisor checklist, interview, essay, exam, speech, project, etc.):

☐ **External certification exam.** Please attach sample questions for the relevant portions of the exam in an appendix (provided that publically revealing this information will not compromise test security). Also, briefly describe how the results of this exam are broken down in a way that leads to nuanced information about the aspect of the core outcome that is being investigated.

☐ **SAC-created, non-course assessment.** Please attach the assessment in an appendix. If the assessment cannot be shared, indicate the type of assignment (e.g., essay, exam, speech, project, etc.):

☐ **Portfolio.** Please attach sample instructions/activities/etc. for the relevant portions of the portfolio submission in an appendix. Briefly describe how the results of this assessment are broken down in a way that leads to nuanced information about the aspect of the core outcome that is being investigated:

☐ **TSA.** Please attach the relevant portions of the assessment in an appendix. If the assessment cannot be shared, indicate the type of assignment (e.g., essay, exam, speech, project, etc.):

☐ **Survey**

☐ **Interview**

☐ **Other.** Please attach the activity/assessment in an appendix. If the activity cannot be shared, please briefly describe:

In the event publically sharing your assessment documents will compromise future assessments or uses of the assignment, do not attach the actual assignment/document. Instead, please give as much detail about the activity as possible in an appendix.

2B. How will you score/measure/quantify student performance?

☒ **Rubric** (used when student performance is on a continuum - if available, attach as an appendix – if in development - attach to the completed report that is submitted in June)
☐ **Checklist** (used when presence/absence rather than quality is being evaluated - if available, attach as an appendix – if in development - attach to the completed report that is submitted in June)
☐ **Trend Analysis** (often used to understand the ways in which students are, and are not, meeting expectations; trend analysis can complement rubrics and checklist)
☐ **Objective Scoring** (e.g., Scantron scored examinations)
☐ **Other** – briefly describe:

2C. Type of assessment (select one per column)

☒ **Quantitative**	☒ **Direct Assessment**
☐ **Qualitative**	☐ **Indirect Assessment**

If you selected 'Indirect Assessment', please share your rationale:

Qualitative Measures: projects that analyze in-depth, non-numerical data via observer impression rather than via quantitative analysis. Generally, qualitative measures are used in exploratory, pilot projects rather than in true assessments of student attainment. Indirect assessments (e.g., surveys, focus groups, etc.) do not use measures of direct student work output. These types of assessments are also not able to truly document student attainment.

2D. Check any of the following that were used by your SAC to create or select the assessment/scoring criteria/instruments used in this project:

☒ Committee or subcommittee of the SAC collaborated in its creation
☐ Standardized assessment
☐ Collaboration with external stakeholders (e.g., advisory board, transfer institution/program)
☐ Theoretical Model (e.g., Bloom's Taxonomy)
☐ Aligned the assessment with standards from a professional body (for example, The American Psychological Association Undergraduate Guidelines, etc.)
☐ Aligned the benchmark with the Associate's Degree level expectations of the Degree Qualifications Profile
☐ Aligned the benchmark to within-discipline post-requisite course(s)
☐ Aligned the benchmark to out-of-discipline post-requisite course(s)
☐ Other (briefly explain:)

2E. In which quarter will student artifacts (examples of student work) be collected? If student artifacts will be collected in more than one term, check all that apply.

☐ **Fall** ☐ **Winter** ☒ **Spring** ☐ **Other** (e.g., if work is collected between terms)

2F. When during the term will it be collected? If student artifacts will be collected more than once in a term, check all that apply.

☒ **Early** ☐ **Mid-term** ☒ **Late** ☐ **n/a**

2G. What student group do you want to generalize the results of your assessment to? For example, if you are assessing performance in a course, the student group you want to generalize to is 'all students taking this course.'

all students taking this course

2H. There is no single, recommended assessment strategy. Each SAC is tasked with choosing appropriate methods for their purposes. Which best describes the purpose of this project?

☒ **To measure established outcomes and/or drive programmatic change (proceed to section H below)**
☐ **To participate in the Multi-State Collaborative for Learning Outcomes Assessment**
☐ **Preliminary/Exploratory Investigation**

If you selected 'Preliminary/Exploratory', briefly describe your rationale for selecting your sample of interest (skip section H below). For example: "The SAC intends to add a Cultural Awareness related outcome to this course in the upcoming year. 2 full-time faculty and 1 part-time faculty member will field-test 3 different activities/assessments intended to measure student attainment of this proposed course outcome. The 3 will be compared to see which work best."

2I. Which will you measure?

☒ **the population** (all relevant students – e.g., all students enrolled in all currently offered sections of the course)
☐ **a sample** (a subset of students)

If you are using a sample, select all of the following that describe your sample/sampling strategy (refer to the Help Guide for assistance):

☐ **Random Sample** (student work selected completely randomly from all relevant students)

☐ **Systematic Sample** (student work selected through an arbitrary pattern, e.g., 'start at student 7 on the roster and then select every 5th student following'; repeating this in all relevant course sections)
☐ **Stratified Sample** (more complex, consult with an LAC coach if you need assistance)
☐ **Cluster Sample** (students are selected randomly from meaningful, naturally occurring groupings (e.g., SES, placement exam scores, etc.)
☐ **Voluntary Response Sample** (students submit their work/responses through voluntary submission, e.g., via a survey)
☐ **Opportunity/Convenience Sample** (only some of the relevant instructors are participating)

The last three options in bolded red have a high risk of introducing bias. If your SAC is using one or more of these sample/sampling strategies, please share your rationale:

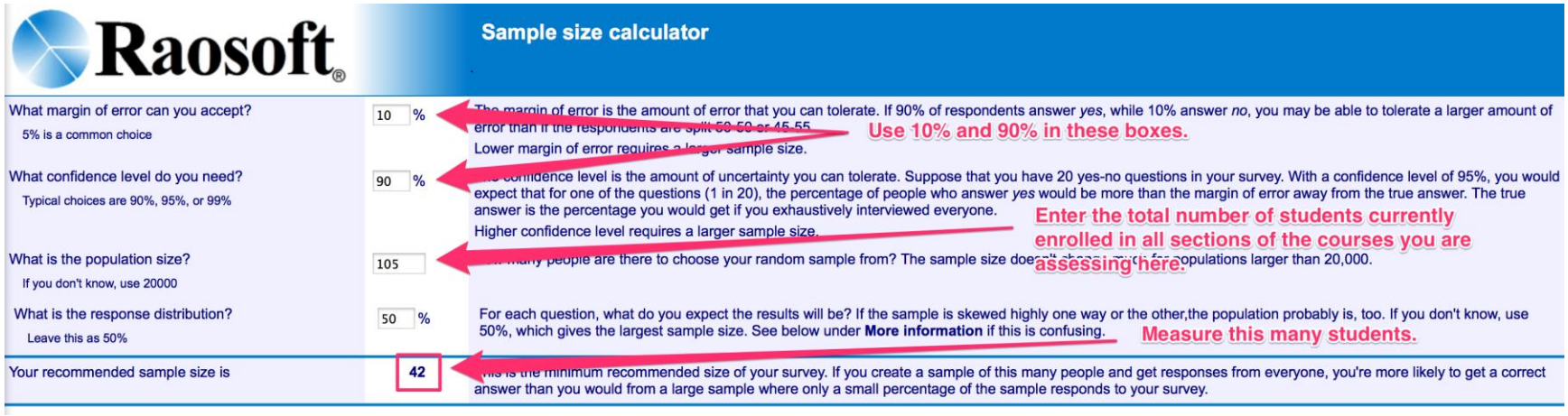
2J. Briefly describe the procedure you will use to select your sample (including a description of the procedures used to ensure student and instructor anonymity. *For example:*

"We chose to use a random sample. We asked our administrative assistant to assist us in this process and she was willing. All instructors teaching course XXX will turn-in all student work to her by the 9th week of Winter Quarter. She will check that instructor and student identifying information has been removed. Our SAC decided we wanted to see our students' over-all performance with the rubric criteria. Our administrative assistant will code the work for each section so that the scored work can be returned to the instructors (but only she will know which sections belong to which instructor). Once all this is done, I will number the submitted work (e.g., 1-300) and use a random number generator to select 56 samples (which is the sample size given by the Raosoft sample size calculator for 300 pieces of student work). After the work is scored, the administrative assistant will return the student work to individual faculty members. After this, we will set up a face-to-face meeting for all of the SAC to discuss the aggregated results."

all students in the program will be measured

2K. Follow this link to determine how many artifacts (samples of student work) you should include in your assessment: http://www.raosoft.com/samplesize.html (see screen shot below). ***Estimate the size of the group you will be measuring (either your sample or your population size [when you are measuring all relevant students]). Often, this can be based on recent enrollment information (last year, this term, etc.):***

15



3. Project Mechanics

3A. Does your project utilize a rubric for scoring? ☒ **Yes** ☐ **No**

If 'No', proceed to section B. If 'Yes', complete the following.

Whenever possible, multiple raters should always be used in SAC assessment projects that utilize rubrics or checklists. SACs have several options for ensuring that ratings are similar across each rater. The most time consuming option is for all raters to collectively rate and discuss each artifact until they reach 100% agreement on each score (this is called **consensus**). In most cases, SACs should consider a more efficient strategy that divides the work (a norming or calibrating session). During a norming session, all raters participate in a training where the raters individually score pre-selected student work and then discuss their reasons for giving

the scores they chose. Disagreements are resolved and the process is repeated. When the participants feel they are all rating student work consistently, they then independently score additional examples of student work in the norming session (often 4-6 artifacts). The ratings for these additional artifacts are checked to see what percentage of the scores are in agreement (the standard is 70% agreement or higher). When this standard is reached in the norming session, the raters can then divide-up the student work and rate it independently. If your SAC is unfamiliar with norming procedures, contact Chris Brooks to arrange for coaching help for your SAC's norming session.

Which method of ensuring consistent scoring (inter-rater reliability) will your SAC use for this project?

☐ **Agreement** – the percentage of raters giving each artifact the same/similar score in a norming session

If you are using agreement, describe your plan for plan for conducting the "norming" or "calibrating" session:

☒ **Consensus** - all raters score all artifacts and reach agreement on each score

Though rarely used at PCC, some SACs might occasionally use the consistency measure for determining the similarity of their ratings. Consistency is generally only recommended when measuring student improvement – not for showing outcome attainment (which explains its rarity). See the Help Guide for more information. Check here if you will be using consistency calculations in this assessment.

☐ **Consistency*** – raters' scores are correlated: this captures relative standing of the performance ratings - but not precise agreement – and then briefly describe your plan:

3B. Have performance benchmarks been specified?

The fundamental measure in educational assessment is the number of students who complete the work at the expected/required level. We are calling this SAC-determined performance expectation the 'benchmark.'

☒ **Yes** (determined by faculty consensus – all instructors who currently teach the course)
☐ Yes (determined by only some of the instructors who currently teach the course)
☐ **Yes** (determined by alignment with an external standard: e.g., standards published by the discipline's professional organization)
☐ **Yes** (determined by post-requisite course expectations within PCC)
☐ **Yes** (determined by post-requisite course expectations for transfer institution)
☐ **Yes** (other). Describe briefly:

☐ **No**

If yes, briefly describe your performance benchmarks, being as specific as possible (if needed, attach as an appendix):

specific standards of semiconductor processes and processing aligned with the course outcomes.

If no, what is the purpose of this assessment (for example, this assessment will provide information that will lead to developing benchmarks in the future; or, this assessment will lead to areas for more detailed study; etc.)?

3C. The purpose of this assessment is to have SAC-wide evaluation of student work, not to evaluate a particular instructor or student. Before evaluation, remove identifying student information (and, when possible remove instructor identifying information). If the SAC wishes to return instructor-specific results, see the Help Guide for suggestions on how to code and collate. Please share your process for ensuring that all identifying information has been removed.

only processed statistical results will be shared

3D. Will you be coding your data/artifacts in order to compare student sub-groups? ☐ **Yes** ☒ **No**

If yes, select one of the boxes below:

☐ **student's total earned hours** ☐ **previous coursework completed** ☐ **ethnicity** ☐ **other**

Briefly describe your coding plan and rationale (and if you selected 'other', identify the sub-groups you will be coding for:

*3E. Ideally, student work is **evaluated** by both full-time and adjunct faculty, even if students being assessed are taught by only full-time and/or adjunct faculty. Further, more than one rater is needed to ensure inter-rater reliability. If you feel only one rater is feasible for your SAC, please consult with an LAC coach prior to submitting your plan/conducting your assessment.*

Other groups may be appropriate depending on the assessment. Check all that apply.

☐ PCC Adjunct Faculty within the program/discipline
☒ PCC FT Faculty within the program/discipline
☐ PCC Faculty outside the program/discipline

- ☐ Program Advisory Board Members
- ☐ Non-PCC Faculty
- ☐ External Supervisors
- ☐ Other:

End of Planning Section – Complete the remainder of this report after your assessment project is complete.

Beginning of End of Year Reporting Section – complete the following sections after your assessment project is complete.

4. Changes to the Assessment Plan

Have there been changes to your project since you submitted the planning section of this report? ☒ ***Yes*** ☐ ***No***

If so, note the changes in the planning section above.

5. Results of the Analysis of Assessment Project Data

5A. Quantitative Summary of Sample/Population

How many students were enrolled in all sections of the course(s) you assessed this year? 15

If you did not assess in a course, report the number of students that are in the group you intend to generalize your results to.

How many students did you actually assessed in this project? 15

Did you use a recommended sample size (see the Sample Size Calculator linked to above)? ☐ ***Yes*** ☐ ***No***

If you did not use a recommended sample size in your assessment, briefly explain why:

all students who completed the course were assessed

5B. Did your project utilize a rubric for scoring? ☒ *Yes* ☐ *No*

If 'No', proceed to section C. If 'Yes', complete the following.

How was inter-rater reliability assured? (Contact your SAC's LAC Coach if you would like help with this.)

☐ **Agreement** – the percentage of raters giving each artifact the same/similar score in a norming session
☒ **Consensus** - all raters score all artifacts and reach agreement on each score
☐ **Consistency** – raters' scores are correlated: this captures relative standing of the performance ratings - but not precise agreement
☐ **Inter-rater reliability was not assured.**

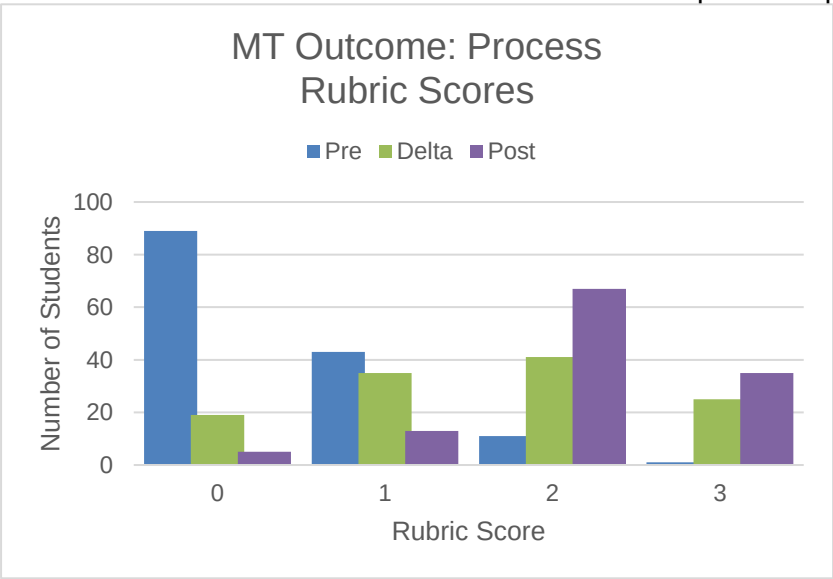
If you utilized agreement or consistency measures of inter-rater reliability, report the level here:

5C. Brief Summary of Your Results

In most cases, report the numbers of students who attain your benchmark level and the numbers who do not. ***Do not average these numbers or combine dissimilar categories (e.g., do not combine ratings for communication and critical thinking together).*** *If your project measures how many students attain the overall benchmark level of performance, report the summary numbers below (choose one):*

1. *If you used frequencies (the actual number who attained the desired level(s) and the actual number who did not), report those here for each of your criteria for this learning outcome. For example, "54 students attained the benchmark level over-all in written communication and 7 did not. Our SAC used 5 criteria within this rubric: 58 student achieved the benchmark level in idea expression (4 did not); 54 achieved the benchmark level for use of standard English (10 did not); etc."*

Averaging criteria, 8 students met this benchmark, 7 did not. The graph shows the distribution of scores, with the benchmark post score being 2. The average post score was 1.8. We would expect students to have a pre score of 1 based on their previous course outcomes. 11 students showed better than expected improvement, increasing their score by more than 1 point.



Rubric: 3: Demonstrates a high level of ability – will be able to

achieve the ability independently utilizing generally available resources, 2: Demonstrates an acceptable level of ability – will be able to achieve the ability in the short term under moderate instruction, 1: Demonstrates an inferior level of ability – will be able to follow directed procedures to achieve the ability, but may require additional or continuing direction/instruction to act independently, 0: Does not demonstrate the ability

2. *If your project used percentages of the total to identify the degree of benchmark attainment in this project, report those here for each of your criteria for this learning outcome. For example, "89% of 61 students attained the benchmark level over-all in written communication. Our SAC used 5 criteria within this rubric: 94% of students achieved the benchmark level in idea expression; 89% achieved the benchmark level for use of standard English; etc."*

3. Compare your students' attainment of your expectations/benchmarks in this reassessment with their attainment in the initial assessment. Briefly summarize your conclusions.

5D. Attach a more detailed description or analysis of your results (e.g., rubric scores, trend analyses, etc.) as an appendix to this document. Appendix attached? ☐ ***Yes*** ☒ ***No***

5E. What did the SAC learn about your students' attainment of your important benchmarks from this reassessment? For example, "We are pleased that most of our students are using standard English in their writing, and want to improve our students' ability to express ideas clearly. We found significant improvements in the reassessment as a result of the changes in instruction and assignments that we made this year…."

This assessment did not show anything that was not clear in the classroom. These students are starting from a much lower level of college preparation than students from years past, and either do not commit the time, or have the time to achieve at the expected levels.

5F. Do the results of this project suggest that additional academic changes might be beneficial to your students (changes in curriculum, content, materials, instruction, pedagogy etc.)? ☐ *Yes* ☒ *No*

If you answered 'Yes,' briefly describe the changes to improve student learning below. If you answered 'No', detail why no changes are called for.

The improvement in the scores, along with previous years shows that the curriculum works. No student can learn if they do not commit the time to their studies.

If you are planning changes, when will these changes be fully implemented?

5G. Has all identifying information been removed from your documents? (Information includes student/instructor/supervisor names/identification numbers, names of external placement sites, etc.) ☒ ***Yes*** ☐ ***No***

6. SAC Response to the Assessment Project Results

6A. Assessment Tools & Processes: Indicate how well each of the following worked for your assessment:

Tools (rubrics, test items, questionnaires, etc.):

☒ *very well* ☐ *some small problems/limitations to fix* ☐ *notable problems/limitations to fix* ☐ *tools completely inadequate/failure*

Please comment briefly on any changes to assessment tools that would lead to more meaningful results if this assessment were to be repeated (or adapted to another outcome).

Processes (faculty involvement, sampling, norming, inter-rater reliability, etc.):

☒ *very well* ☐ *some small problems/limitations to fix* ☐ *notable problems/limitations to fix* ☐ *tools completely inadequate/failure*

Please comment briefly on any changes to assessment process that would lead to more meaningful results if this assessment were to be repeated (or adapted to another outcome).

7. Follow-Up Plan

7A. How will the changes detailed in this report be shared with all FT/PT faculty in your SAC? *(select all that apply)*

- ☒ email
- ☐ campus mail
- ☐ no changes to share
- ☐ phone call
- ☒ face-to-face meeting
- ☐ workshop
- ☐ other

If 'other,' please describe briefly below.

7B. Is further collaboration/training required to properly implement the identified changes?

- ☐ Yes
- ☒ No

If 'Yes,' briefly detail your plan/schedule below.

7C. Sometimes reassessment projects call for additional reassessments. These can be formal or informal. How will you assess the effectiveness of the changes you plan to make?

- ☐ follow-up project in next year's annual report
- ☒ in a future assessment project
- ☐ on-going informal assessment
- ☐ other

If 'other,' please describe briefly below.

7D. SACs are learning how to create and manage meaningful assessments in their courses. This development may require SAC discussion to support the assessment process (e.g., awareness, buy-in, communication, etc.). Please briefly describe any successful developments within your SAC that support the quality assessment of student learning. If challenges remain, these can also be shared.